Hops and ramsons as preservatives against Listeria monocytogenes in cooked sausages

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10th Symposium on Food Microbiology

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Konventium (LO skolen), Helsingør

The LMC Food Microbiology Network was established in 2003 in order to initiate new and intensify existing collaborations between researchers working on food microbiology within LMC. One of the means by which to achieve this is through a yearly meeting in May/June that also this time will be held as a 1½-day symposium at Konventium (Lo-skolen) in Helsingør. The **Program** of the meeting will consist of **speakers** selected from abstracts submitted by the LMC food microbiologists, **posters** and **invited speakers**. At present the program will be plenum lectures and two parallel sessions. The following themes have been identified:

- Metagenomics, Invited speaker **Søren J. Sørensen** (KU)
- Food production and processing.
- Molecular mechanisms Invited speaker **Morten Nørholm** (Centre for Biosustainability - DTU)
- Positive microbiology, Invited speaker **Hentie Swiegers** (Christian Hansen)
- Virulence and resistance. Invited speaker **William Kelley** (Geneva University Hospital)

Registration fee

The registration fee is **1000 DKK for LMC participant that register before March 30th 2012**. The fee for registration is **3.000 DKK after March 30th and for participants from outside LMC**. The number of participants will be limited to 70.

Registration is done using this link: http://www.conferencemanager.dk/lmc2012

Abstracts

All participants are encouraged to submit an abstract suitable for a poster or oral presentation together with their registration. The abstract should not exceed 300 words (1700 characters) and it should include: 1) a title, 2) presenting scientist(s) and 3) institution(s). Please indicate in your e-mail registration if you prefer **oral** or **poster** presentation and if you are a **Ph.D.-student**. The abstract should be received together with you registration **before March 30th 2010.**

Abstract should be send to Lars Bogø Jensen: lboj@food.dtu.dk

Location and transportation

The symposium will take place at Konventium (Lo-skolen), Gl. Hellebækvej 70, 3000 Helsingør, Tlf.: +45 4928 0900 | Fax: +45 4921 6566 |E-mail: info@konventum.dk , Transportation to and from Lo-skolen, Helsingør will be at **own cost**, and individually organized. Directions are given at the website http://www.konventum.dk/.

Nr.25:

Significance of the ClpX chaperone on the cell wall of *Staphylococcus aureus*

Mia Dupont[1], Kristoffer T. Bæk[1], Angelika Gründling[2] and Dorte Frees[1]

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The cell wall of Gram-positive bacteria is typically composed of peptidoglycan, wall teichoic acid, lipoteichoic acid (LTA), and a variety of proteins. LTA is essential for growth of *Staphylococcus aureus*, but we have found that deletion of the gene encoding the ClpX chaperone allows *S. aureus* to grow without LTA. ClpX belongs to the family of Clp ATPases whose members have folding activities typical of molecular chaperones, and in addition, ClpX and the peptidase ClpP form a proteolytic complex in which ClpX specifically recognize and translocate the substrates into the proteolytic chamber. In this project, we want to investigate the link between ClpX and the cell wall, and determine how lack of ClpX bypasses the cell's need for LTA. We have found that deletion of the *clpX* gene in two different strain backgrounds increases resistance to cell-wall attacking antibiotics, supporting the hypothesis that ClpX has an impact on the cell wall properties of *S. aureus*.

Nr. 26:

Evaluation of growth potential of *Listeria monocytogenes* and *Salmonella* in a sandwich environment

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Introduction: Time and temperature control is crucial to avoid growth of pathogens during production and serving of cold ready-to-eat meals. To ensure product safety, the lag time of pathogens must, therefore, not be exceeded during production and serving time.
Aim: The aim of this study was to evaluate existing predictive growth models for *Salmonella* and *Listeria monocytogenes* in a sandwich environment.
Material and methods: Initially, a selection process among sandwich ingredients was performed, looking at their potential as a growth substrate. The most frequently used ingredients having relatively high pH and low salt content were lettuce (pH 5.9) and cooked chicken (pH 6.2). Data describing the effect of temperature on growth rates and lag times of *Salmonella* and *L. monocytogenes* on lettuce and cooked chicken were collected from the literature. For evaluation of collected data, challenge tests were conducted at four temperatures between 6 and 23°C on lettuce pieces (5x5 cm^2) and sliced cooked chicken filets. In the web-based programme, DMFit, parameters such as growth rate and lag time were estimated for *Salmonella* and *L. monocytogenes* using the Baranyi and Roberts models.
Results: On lettuce, growth rates for *Salmonella* and *L. monocytogenes* were comparable with literature data, with a tendency of faster growth of *Salmonella* in our study. Lag times on lettuce appeared longer for *Salmonella* but shorter for *L. monocytogenes* for temperatures lower than 16ºC in our study. On chicken, both growth rates as well as lag times for *Salmonella* were consistent with literature data. For *L. monocytogenes*, growth rates compared to literature, while for lag times, no literature data were available.
Conclusion: Our data will be merged with relevant literature data for developing models for more certain prediction of lag times of *Salmonella* and *L. monocytogenes* under dynamic temperature profiles observed during sandwich production in catering units.

Nr.31:

Hops and Ramsons as Preservatives against *Listeria monocytogenes* in Cooked Sausages

Anne M. Bollerslev (DTU Food), Tina Beck Hansen (DTU Food) and Flemming Hansen (DMRI, Danish Technological Institute).

The present study was made as a search for natural ingredients, which can be used for inhibition of *Listeria monocytogenes* in slices of cooked sausages. Based on a preliminary screening of several plants, dried hop cones and fresh ramsons onions were found to demonstrate the best anti-listerial effect and were therefore used in further experiments. The addition of 5 % hops and a combination of 2.5 % hops and 2.5 % ramsons, to a cooked sausage without content of nitrite, resulted in a total inhibition of growth by *L. monocytogenes* during a storage period of 27 days at 5 °C. Compared to a control sausage without nitrite, the inhibition was 5.9 log10 CFU/g in the cooked sausage containing 5 % hops and 5.2 log10 CFU/g in the one containing 2.5 % hops and 2.5 % ramsons. In contrast, the addition of 5 % ramsons only resulted in an inhibition of 0.8 log10 CFU/g after 27 days of storage.

Three methods were used in order to study if hops affect the cytoplasmic membrane of *L. monocytogenes* cells, as a part of its antimicrobial mechanism of action. Affection of the osmoregulation in the *L. monocytogenes* cells was indicated after treatment with a 2 % aqueous hops extract and a 0.5 % hops beta acids solution. Visible deformation of the cells was seen by use of fluorescent dyes and laser scanning confocal microscopy. Leakage of potassium from the cells could not be confirmed by use of ICP-AES due to a high level of potassium in the hops extract.

Nr. 32

***In vitro* fermentation of sugar beet arabino-oligosaccharides by fecal microbiota obtained from patients with ulcerative colitis to selectively stimulate the growth of *Bifidobacterium* spp. and *Lactobacillus* spp.**

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The commensal bacteria found in the human gut are important for host health, and an unfavorable composition of the gut microbiota can affect the synergistic interaction that exists between microbes and their host. An altered microbial composition is suggested to play a pivotal role in the pathogenesis of ulcerative colitis (UC), an inflammatory bowel disease, and compositional changes have been observed in the colonic microbiota by us as well as by other research groups 1-3. Since bifidobacteria and lactobacilli may excert anti-inflammatory effects, a reduced level of these commensal bacteria may compromise the colon health and favor intestinal inflammation. In this study, selective stimulation of fecal bifidobacteria and lactobacilli from healthy subjects and UC patients in remission or with active disease were investigated using arabino-oligosaccharides (AOS; DP2-10) derived from sugar beet pulp. The fermentative-induced changes were compared to those for fructo-oligosaccharides (FOS), which are known to have a prebiotic effect. The fermentation studies were carried out using a validated small-scale static batch system, and changes in the fecal microbial communities and metabolites were monitored after 24 h by quantitative real-time PCR and short-chain fatty acid analysis. With a few minor exceptions, AOS affected the communities similarly to what was seen for FOS. Quantitative real-time PCR revealed that *Bifidobacterium* spp. and *Lactobacillus* spp. were selectively increased after fermentation of AOS or FOS by fecal microbiota derived from UC patients. The stimulation of growth of *Lactobacillus* spp. and *Bifidobacterium* spp. was accompanied by a high production of acetate and hence a decrease of pH. The fermentation of AOS may